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A New Correlation for Libyan Crude Oil to Estimate the Gas Solubility at Bubble-Point Pressure

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ABSTRACT

The PVT properties are ideally determined experimentally in the LAB. However, some of these experimental data is not always available; consequently, empirical correlations are used to estimate them. Many researchers have been focused on models for predicting reservoir fluid properties from the available experimental PVT data. Our present study divided into parts, the first part is the comparison study where we compared between some of the available empirical PVT correlations for estimating the solution gas-oil ratio at the bubble point for some Libyan crude oils based on the available 35 data point samples collected from some Libyan oil fields. The Microsoft Excel was used in the comparison study; the results showed that Standing's and Marhoun's correlations calculated the lowest and highest Absolute Average Relative Error (AARE) of 26% and 272% respectively in the range of our studied data. In the second part of this study a new correlation was derived to predict the Gas Solubility at Bubble-Point Pressure using Eviews software, and compared the output results of this new correlation with the derived correlations used in the first part of this study using statistical analysis such as AARE, Maximum Absolute Relative Error (Max. ARE), Minimum Absolute Relative Error (Min. ARE), R², and cross – plot analysis. The results showed good statistical analyses AARE, min ARE, max ARE and R² of about 14%, 0.2%, 29.3% and 0.924 respectively, for our new correlation to estimate the solution gas ratio at Pb. This result was better than the values were obtained from the other evaluated empirical correlations.

Keywords. PVT properties, Empirical Correlations, Bubble point pressure, solution gas ratio.